

implanting, in the predetermined regions of the silicon substrate, a chemical species with an implantation energy between 2 and 15 keV and with an implanted dose from 5×10^{13} to 5×10^{15} atoms/cm² wherein the chemical species is Ar, Ne or He;

oxidizing the surface of the silicon substrate to form a gate oxide layer of non uniform thickness; and

forming MOS transistors at the predetermined regions of the silicon substrate, wherein the oxidized layer at the predetermined regions forms the gate oxide layer of the MOS transistors.

52. (Amended) A semiconductor device comprising a plurality of MOS transistors on a silicon substrate, wherein a portion of the MOS transistors comprise a gate oxide layer of a first thickness, and wherein the other MOS transistors comprise a gate oxide layer of a second thickness, wherein the second thickness is greater than the first thickness, and wherein the gate oxide layer of a first thickness is formed by oxidation of predetermined non-implanted regions of the silicon substrate, and wherein the gate oxide layer of a second thickness is formed by the method comprising:

implanting a chemical species into predetermined regions of the silicon substrate corresponding to the predetermined location of the other MOS transistors with an implantation energy between 2 and 15 keV and with an implanted dose from 5×10^{13} to 5×10^{15} atoms/cm² wherein the chemical species is Si, Ge, Ar, Ne or He; and

oxidizing the surface of the silicon substrate to form a gate oxide layer having a thickness greater than the first thickness.